PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference O.Z.6245-WO	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2004/051072	International filing date *(day/month/year)* 09.06.2004	Priority date *(day/month/year)* 05.08.2003
International Patent Classification (IPC) or national classification and IPC C09D7/00		
Applicant DEGUSSA AG		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15.02.2005	05.12.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Lentz, J.C. Telephone No. +31 70 340-2130

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/051072

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-15 as originally filed

   Claims, Numbers

   1-16 received on 06.09.2005 with letter of 05.09.2005

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-16
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-16
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 Reference is made to the following documents:

D1 : WO 96/16109 A (AMERON) 30 May 1996 (1996-05-30)

D2 : US 2002/193504 A1 (BRUECK ET AL) 19 December 2002 (2002-12-19)

D3 : US 5 997 943 A (AZZOPARDI) 7 December 1999 (1999-12-07)

The subject-matter of the present application is a coating composition comprising 2 components, the 1st comprising a silane (I) and/or silane (II), the 2nd component comprising water, an acid and a solvent/diluent.

D1 describes a coating composition comprising an organoalkoxysilane falling under the definition of present silane (II). The coating system of D1 is a two component system, see page 15, and water may be added to either component. D1 also comprises a polysiloxane which may be considered as an oligomer, when having a molecular weight of 400.

D2 also describes a two-component coating system, see claim 11, comprising fluorosilane, see page 3 [0044], and 'customary additives' such as solvents, see page 5, [0064].

D3 comprises a mix of a fluoroalkylsilane and an aqueous solvent system, the components are preferably mixed shortly before application, see col 4, lines 12-20.

None of the cited documents disclose a component comprising water, acid and a solvent. The subject-matter of present claim thus fulfils the requirements of Art 33(2) PCT. Concerning inventivity, the effect of the differences, i.e. composition of component 2 comprising water, acid and solvent, it seems from table 3 to result in a higher abrasion resistance. The problem was thus to create a (repellent) coating with a higher abrasion resistance. The solution was not indicated in the cited prior art documents, nor was it obvious. The requirements of Art 33(3) are thus also fulfilled.

Re Item VIII.

The inventivity of the invention vs. the cited documents was accepted because of the definition

of the 2nd component, compulsory comprising water, acid and solvent/diluent. Therefore, page 6 of the description should be amended concordingly. Furthermore, claim 6 is not acceptable since therein formulation 2 is entirely made up of water. Similarly, claim 8 is not acceptable or consistent with claim 1 since in this claim formulation 2 could consist of solvent only.

Chemically speaking, one could further doubt whether formulation 2 could comprise as much as 99.9% water and still be inventive vs. the cited prior art documents, since the content of 0.01% solvent and acid would practically/industrially not be measurable and could be regarded as an impurity only.

Concerning claim 4, the 'oligomeric silicic ester' (normally called siloxane) is not well defined, in case n=3, a terminal unit is depicted meaning the compound is a siloxane with only two Si atoms, if n=2 it should be a cyclic siloxane (no other units are indicated to be present) and in case n=1 a polysilsesquioxane, a ladder polymer/oligomer, is depicted.

What is claimed is:

1. A two-component system for equipping surfaces with an oil, water, and dirt repellent coating, the two-component system being composed of
a formulation 1
including at least one fluoroalkylsilane of the general formula I

$$R^1\text{-}Y_u\text{-}(CH_2)_2Si(CH_3)_q(R^2)_{3-q} \qquad (I)$$

in which R^1 is a linear, branched or cyclic and also mono-, oligo- or perfluorinated alkyl group having 1 to 13 carbon atoms or a mono-, oligo- or perfluorinated aryl group, Y is a $-(CH_2)$, O or S group and u is 0 or 1, R^2 is a chlorine atom or an alkoxy group having 1 to 4 carbon atoms, and q is 0 or 1,

and/or at least one alkylsilane of the general formula II

$$R^3Si(CH_3)_p(R^4)_{3-p} \qquad (II),$$

in which R^3 is a linear, branched or cyclic alkyl group having 1 to 18 carbon atoms, R^4 is a chlorine atom or an alkoxy group having 1 to 4 carbon atoms, and p is 0 or 1,

and a formulation 2,
wherein formulation 2 contains water, an organic or inorganic acid, and a solvent or diluent,
and both formulations being mixed together shortly before application.

2. The two-component system as claimed in claim 1,
wherein in formulation 1 the amount of silane of formula I and/or II is from 0.1 to 60% by weight, based on formulation 1.

3. The two-component system as claimed in claim 1 or 2,
with formulation 1 including at least one silane of the general formula III

with formulation 1 including at least one silane of the general formula III

$$Si(R^5)_4 \qquad (III)$$

in which groups R^5 are identical or different and R^5 is a chlorine atom or an alkoxy group having 1 to 4 carbon atoms,

and/or at least one oligomeric silicic ester of the general formula IV

$$(R^6)_nSiO_{(4-n)/2} \qquad (IV),$$

in which groups R^6 are identical or different and R^6 is a hydroxyl group or an alkoxy group having 1 to 4 carbon atoms, and n is 1 or 2 or 3.

4. The two-component system as claimed in any one of claims 1 to 3, wherein in formulation 1 the amount of silane of formula III and/or of a silicic ester of formula IV is ≤ 10% by weight, based on formulation 1.

5. The two-component system as claimed in any one of claims 1 to 4, wherein formulation 1 contains a solvent or diluent in an amount of from 40 to 99.9% by weight, based on formulation 1.

6. The two-component system as claimed in any one of claims 1 to 5, wherein formulation 2 contains water in an amount of from 0.001 ppm by weight to 100% by weight, based on formulation 2.

7. The two-component system as claimed in any one of claims 1 to 6, wherein formulation 2 contains an organic or inorganic acid in an amount of from 0.001 to 10% by weight, based on formulation 2.

8. The two-component system as claimed in any one of claims 1 to 7, wherein formulation 2 contains a solvent or diluent in an amount of ≤ 100% by weight, based on formulation 2.

9. The two-component system as claimed in any one of claims 1 to 8, comprising at least one solvent and/or diluent from the group of the alcohols, the glycols, the ethylene glycol ethers, the propylene glycol ethers, the ketones, and the esters.

10. The two-component system as claimed in any one of claims 1 to 9, wherein formulation 1 or 2 contains a wetting agent in an amount of ≤ 10% by weight, based on the respective formulation.

11. A method of equipping surfaces with an oil, water, and dirt repellent coating as set forth in any one of claims 1 to 10, which comprises
- cleaning and if desired pretreating the surface to be treated,
- combining and mixing formulations 1 and 2 of the two-component system,
- reacting the mixture for at least 2 minutes, and
- thereafter applying the mixture to the surface.

12. The method as claimed in claim 11, wherein the surface is degreased and a metal oxide slurry is used for carrying out the pretreatment.

13. The method as claimed in claim 11 or 12, wherein coating is carried out at a temperature of from 0 to 50°C.

14. The method as claimed in any one of claims 11 to 13, wherein the mixture formed from formulations 1 and 2 is applied to the surface by spraying, brushing, flowcoating, dipping, knife coating or polishing.

15. The use of a two-component system as set forth in any of claims 1 to 10 for coating surfaces for equipping them with water, oil, and dirt repellency properties or for improving the weather stability, corrosion resistance, abrasion resistance and/or chemical resistance, or protecting against graffiti.

16. The use of a two-component system as claimed in claims 1 to 10 for coating glass surfaces, ceramic surfaces, metal surfaces or polymer surfaces.